NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

CRITICAL AREA PLANTING

(Acre)

CODE 342

DEFINITION

Establishing permanent vegetation on sites that have or are expected to have high erosion rates, and on sites that have physical, chemical or biological conditions that prevent the establishment of vegetation with normal practices.

PURPOSE

- Stabilize areas with existing or expected high rates of soil erosion by water.
- Stabilize areas with existing or expected high rates of soil erosion by wind.
- Restore degraded sites that cannot be stabilized through normal methods.

CONDITIONS WHERE PRACTICE APPLIES

On areas with existing or expected high rates of erosion or degraded sites that usually cannot be stabilized by ordinary conservation treatment and/or management, and if left untreated, could be severely damaged by erosion or sedimentation or could cause significant off-site damage.

CRITERIA

General Criteria Applicable To All Purposes

Species selected for seeding or planting shall be suited to current site conditions and intended uses. Selected species will have the capacity to achieve adequate density and vigor within an appropriate time frame to stabilize the site sufficiently to permit suited uses with ordinary management activities.

Species, rates of seeding or planting, minimum quality of planting stock, such as PLS or stem caliper, and method of establishment shall be specified before application. Only viable, high quality seed or planting stock will be used.

Site preparation and seeding or planting shall be done at a time and in a manner that best ensures survival and growth of the selected species. What constitutes successful establishment, e.g. minimum percent ground/canopy cover, percent survival, stand density, etc. shall be specified before application.

Fertilization, mulching, or other facilitating practices for plant growth shall be timed and applied to accelerate establishment of selected species. If the recommended fertilizer rate exceeds the criteria in Conservation Practice Standard (590) Nutrient Management, appropriate mitigating practices will be installed to reduce the risk of nutrient losses from the site.

Comply with all applicable federal, state, and local laws, rules, and regulations.

Where possible, grade the area to make planting and maintenance feasible. Slopes must be stable to achieve successful establishment. A slope stability analysis shall be performed where slopes are steeper than 3:1 where other practices and near by structures and facilities could be affected by an unstable slope. Slopes shall not exceed 1.5:1 (1.5 horizontal feet for 1 vertical foot) to achieve stability. A final slope of 3:1 or flatter is preferred to facilitate equipment use.

Install water control practices such as diversions and waterways as needed. Perform cultural practices as near to contour as practicable. Remove all large stones and other debris.

Apply lime to attain a pH of 6.0, if required by the selected seed mixture. Where possible, incorporate lime and fertilizer into the top two inches of soil.

Additional Criteria Applicable To Temporary Grass or Grain Cover

Select a temporary seeding recommendation from Table 1. Cover grass seed with 1/4 inch of soil. Cover rye or other grain seed with one to two inches of soil.

Fertilize temporary grass or grain cover according to soil test. In lieu of soil test, fertilize as follows:

Fertilizer	Grass Mixture (lbs.)	Grass/Legume Mixture (lbs.)
Nitrogen (N)	60	30
Phosphorous (P_2O_5)	30	30
Potassium (K_2O)	30	60

On sites within 50 feet of a water source use half this rate or none at all if there is potential for runoff to enter the water.

Apply mulch to establish adequate ground cover and reduce erosion. Apply hay or straw mulch at a rate of two tons per acre. In areas with a plan to restore a threatened or endangered plants use only weed free straw.

Table 1 - Temporary Seeding Recommendations by Rate and Site Adaptation

Species/Mixture Adaptation	Rate in LBS/Acre (LBS/1000 Sq. Ft.)	Recommended Cut-Off Date for Seeding	Site	Notes
Annual Ryegrass	20 (0.5)	September 15	A	Not always winter hardy
Perennial Ryegrass	20 (0.5)	June 1	A	
Oats	96 (2.25)	June 1(Aug 15)	A	Winter Kills
Cereal Rye	90 (2.0) 120 (if not drilled)	October 15	A	Known as "Winter Rye"
Annual Ryegrass & Oats	10 (0.25) 64 (1.5)	June 1	A	Oats Winter Kill
Weeping Lovegrass	5 (0.1)	June 1	B	

A - Well drained to somewhat poorly drained
B - Droughty and excessively drained

Additional Criteria Applicable To Permanent Grass and/or Legume Cover

Topsoil should be stockpiled in the early stages of the project. This topsoil should be later used to spread a cap (preferably 3 to 4 inches) over the area to be permanently vegetated. The use of topsoil for establishing vegetation in these areas will greatly enhance the seeding efforts. Use topsoil where a good, vigorous sod is needed, such as an auxiliary spillway, or where percent fines are less than 25%.

Seeding should be done immediately after construction or site preparation. Fertilize and lime according to a soil test. In lieu of soil test, fertilize with 10-20-20 at a rate of 500 lbs. per acre (11 lbs. per 1000 square feet). Use caution with this high rate of fertilizer where surface waters may be impacted by storm event before seedling establishment. Lime shall be applied at a rate of 2 tons per acre. Site specific conditions will determine if manure or other bio-solids may be used as an alternative source of nutrients.

Select a permanent seeding recommendation from Table 2 or 3. Cover grass and/or legume seed with 1/4 inch of soil unless seeded by hydroseeder. Cultipacking or tracking the site with a dozer will improve seed to soil contact and enhance uniformity of germination.

Seeding should be done as early as possible in the spring and no later than June 1. Seeding in late summer or fall can be done between August 15 and September 15. These late season plantings are not recommended for mixes 12, 15a, 15b, 18 and 19 in Table 3.

Inoculate legume seed at two times the rate prescribed by the seed dealer immediately prior to the seeding. Inoculate legume seed four times the prescribed rate if hydroseeding.

Hay or straw mulch shall be applied at a rate of two tons per acre (50 lbs. per square foot). When using mixes 12 and 15a in Table 3, apply "weed free" mulch at a rate of 500 to 750 lbs. per acre.

During the second growing season all areas without adequate plant cover shall be scarified (if necessary), fertilized and reseeded. Where required in the plan, mow annually. If ground nesting bird populations are of concern, refrain from mowing until July 15 or later. Caution is needed if warm season grasses are to be mowed. They should be mowed prior to August 15 and not closer than eight inches to the ground surface. Once a good cover is established, topdress in early spring to maintain good plant growth. Typical topdress applications would include:

Fertilizer	Grass Mixture (lbs.)	Grass/Legume Mixture (lbs.)
Nitrogen (N)	60	30
Phosphorous (P_2O_5)	30	60
Potassium (K_2O)	30	60

Mow, lime and fertilize as needed to maintain adequate growth.

Table 2 - Permanent Seeding Recommendations by Use and Mowing Level

PRINCIPLE USE (A)	MIX NUMBER (MOWED)	MIX NUMBER (NOT MOWED)
Borrow Areas (A)	**1,2,6 or 9**	Any Mix except **4**
Dikes, Levees, Dams & Pond Banks	**1,2,6,9 or 13**	**3 or 7**
Drainage Ditches & Channel Banks	**1,2,6 or 9**	**1,2,3,6, or 9**
Diversion (B)	**2,6 or 9**	**2**
Diversion	**2,6 or 9**	**2**
Effluent Disposal Area	**Not Recommended**	**7 & 13**
Gravel Pits (A&C)	**Not Recommended**	**10 or 12**
Gullied & Eroded Areas	**Not Recommended**	**2,9,11 or 13**
Reclaimed Landfill with Liner	**Not Recommended**	**10,11, or 12**
Mine, Waste & Other Spoil Banks (A)	**Not Recommended**	**3,10, or 12**
Recreation Seeding (D)		
Not Shaded	**1,2,4, or 14**	Not Recommended
Shaded	**1,2,4, or 5**	Not Recommended
Road Side & Other Slops and Banks (A)	**1,2,6, or 9**	**2,3 or 10**
Shoreline & Fluctuating Water Levels	**Not Recommended**	**7 & 13**
Ski Slopes	**Not Recommended**	**2 or 8**
Sod Waterways & Spillways	**1,2,3,6 or 9**	**1,2,3,6 or 9**
Sod Waterways & Spillways (B)	**1,2,3,6 or 9**	**1,2,3,6 or 9**
Staging Areas	**Not Recommended**	**6**
Streambanks	**6 or 13**	**2,7,9, or 13**
Utility Rights-of-Ways (A)	**Not Recommended**	**1,2,10 or 12**
Woods, Road & Skid Trails		
Not Shaded	**Not Recommended**	**1,2,6 or 9**
Shaded	**Not Recommended**	**1,5 or 6**

(A) - If suppression of woody growth is desired, and site conditions allow use mix number 18, 19 or 20
(B) - For detail on vegetating sandy and gravelly areas, see Vermont NRCS Publication "Vegetating Vermont Sand and Gravel Pits" in Vermont Conservation Planning Technical References.
(C) - Designed for bare ground velocity.
(D) - Select mix based on percent fines.

TABLE 3 - Permanent Seeding Recommendation by Rate and Site Adaptation

Soil Site Adaptation (A)	Mix #	Seed Mixture	Variety	Rate in LBS/Acre (LBS/1000 Sq. Ft.)

Well to Mod. Well Drained	1	Kentucky Bluegrass Creeping Red Fescue Ryegrass or Redtop	Adelphi/Barron Ensylva Pennfine Common	20 (0.5) 20 (0.5) 5 (0.1) 2 (0.1)
	2	Creeping Red Fescue Redtop and Birdsfoot Trefoil	Ensylva Common Empire	20 (0.5) 2 (0.1) 8 (0.2)
	3	Smooth Bromegrass Ryegrass Birdsfoot Trefoil	Saratoga Pennfine Empire	15 (0.33) 5 (0.1)
	4	Tall Fescue	KY-31	20 (0.5)
Well to Poorly Drained	5	Creeping Red Fescue Kentucky Bluegrass	Ensylva Adelphia/Barron	40 (0.9) 20 (0.5)
	6	Creeping Red Fescue Redtop Tall Fescue or Smooth Bromegrass	Ensylva Common KY-31 Saratoga	20 (0.5) 2 (0.1) 20 (0.5) 20 (0.5)
	7	Reed Canarygrass **(B)** Creeping Foxtail Redtop White Clover	Palaton/Venture Garrison Common Dutch type	15 (0.33) 5 (0.1) 5 (0.1) 2 (0.1)
	8	Tall Fescue Redtop White Clover	KY-31 Common Ladino type	10 (0.25) 2 (0.1) 7 (0.2)
Excessively to Mod. Well Drained	9	Creeping Red Fescue Tall Fescue or Smooth Bromegrass Birdsfoot Trefoil	Ensylva KY-31 Saratoga Empire	20 (0.5) 20 (0.5) 20 (0.5) 8 (0.2)
	10	Switchgrass Big Bluestem Little Bluestem Sand Lovegrass Birdsfoot Trefoil	Shelter/Blackwell Niagara Aldous/Camper NE-27/Bend Viking	4 (0.1) **PLS** 4 (0.1) **PLS** 2 (0.05) **PLS** 1.5 (0.05) **PLS** 2 (0.05) **PLS**
	11	Switchgrass	Shelter/Blackwell	20 (0.5) **PLS**
	12	Tall Fescue Redtop Birdsfoot Trefoil	KY-31 Streaker/Common Viking/Empire	10 (0.25) 2 (0.05) 5 (0.1)
Not Specific	13	Tall Fescue Reed Canarygrass **(B)** Redtop	KY-31 Palaton/Venture Common	20 (0.5) 10 (0.25) 3 (0.1)
	14	Tall Fescue	KY-31	100 (2.5)

(A) - For details on vegetating sandy or gravelly areas, see FOTG Number Technical Reference CPA #10 – "Vegetating Vermont Sand and Gravel Pits."

(B) - Reed Canarygrass - Use only seed with germination rate of 70% or better that has been tested within the past four of five months. **Do not seed in wet areas where it may become invasive to natural habitats.**

(PLS) - Pure Live Seed - Warm season grass seed is sold and planted on the basis of pure live seed (PLS). An adjustment is made to the bulk pounds of seeded to compensate for inert materials and dead seed.

Additional Criteria Applicable To Shrubs and Ground Cover Plantings

Use good planting stock, adapted to soil and site conditions. Special plants require special handling and care. See http://plants.usda.gov/ and pull up plants fact sheets, and contact the State Resource Conservationist for assistance in selecting appropriate plant type and species.

Keep plants moist and cool until planted. Dormant stock should not have initiated growth. Plant in early spring and some species in early fall. The density of cover and species type will govern plant spacing.

Check plants in the spring of the second year of growth. Replant if necessary.

Additional Criteria To Restore Degraded Sites

If gullies or deep rills are present, they will be treated, if feasible, to allow equipment operation and ensure proper site and seedbed preparation.

Soil amendments will be added as necessary to ameliorate or eliminate physical or chemical conditions that inhibit plant establishment and growth. Required amendments, such as compost or manure to add organic matter and improve soil structure and water holding capacity; agricultural limestone to increase the pH of acid soils; or elemental sulfur to lower the pH of calcareous soils shall be included in the site specification with amounts, timing, and method of application.

CONSIDERATIONS

Native species or mixes that are adapted to the site and have multiple values should be considered.

Avoid species that may harbor pests. Species diversity should be considered to avoid loss of function due to species-specific pests.

Some seed mixtures contain KY-13 tall fescue that contains an endophyte harmful to grazing animals.

In using perennial ryegrass within a mixture it is critical to select only those varieties with a known adaptation in Vermont, such as Yorktown II, Manhattan, Diplomat, Omega and Pennfine. Do not use Tetraploid varieties.

Some site locations and conditions may require more innovative approaches to establish adequate cover. For these sites the State Resource Conservationist may elect to refer the site directly to the Plant Materials Specialist.

If mature tree cover is the ultimate goal of a plan, use a temporary herbaceous seeding recommendation listed in Table 1. These may also be used when herbicide residue is likely to preclude successful establishment of perennial species.

For the establishment of trees and the enhancement of wildlife, use Standard 612 – Tree/Shrub Establishment and Standard 645 – Upland Wildlife Habitat Management.

PLANS AND SPECIFICATIONS

Specifications for applying this practice shall be prepared for each site and recorded and filed using the approved specification sheets or narrative statements in the conservation plan.

OPERATION AND MAINTENANCE

Use of the area shall be managed as long as necessary to stabilize the site and achieve the intended purpose.

Control or exclude pests that will interfere with the timely establishment of vegetation.

Inspections, reseeding or replanting, fertilization, and pest control may be needed to insure that this practice functions as intended throughout its expected life.

Mowing of vegetation shall be done only at specified times.

If required to maintain the vegetative stand remove trees, brush and other woody vegetation

Grazing in areas of Critical Area Planting shall not be permitted and livestock shall be excluded at all times.

Inspect and repair water control practices as needed.

Vegetation used on streambanks is subject to considerable damage. The site should be inspected annually in the spring and after heavy run-off to check for needed repairs. Gaps should be filled in by replanting, or laying down and covering the branches with soil of nearby plants. Any structural measures used to control the bank, such as stone riprap, must be kept in repair in order to maintain the effective willow cover.

REFERENCES

http://plant-materials.nrcs.usda.gov/technical publications/critical.html

USDA NRCS and Ducks Unlimited. 1997. Vegetating with Native Grasses in Northeastern North America. 63pp.